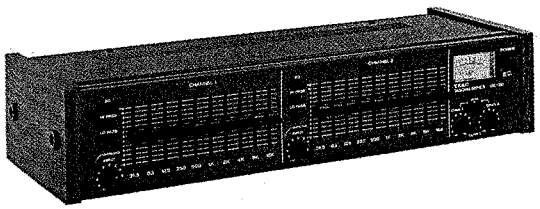
TEAC®

SERVICE MANUAL

GE-20

Graphic Equalizer



TEAC CORPORATION

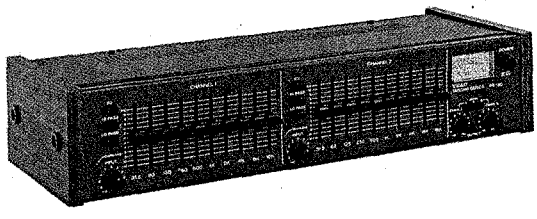
51032460

GENERAL DESCRIPTION

The TEAC GE-20 is a Graphic Equalizer Unit. The way in which you hook up the GE-20 to other equipment depends both on the equipment with which it will be used and the application. For additional information concerning operation, connections and theory, please refer to the GE-20 Owners Manual.

Adjustment procedures are given in this manual which also includes a Parts List and schematic diagram to assist the Service Technician in maintaining the GE-20.

Please feel to contact the nearest TEAC Factory Service Department or write directly to a TEAC office, the addresses of which are printed on the back cover of this manual.



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SPECIFICATION

Circuit Type	Resonance circuit with semiconductors and capacitors
Number of Channels	2
Number of bands	10
Center frequencies	31.5, 63, 125, 500, 1k, 2k, 4k, 8k and 16kHz
Bands per octave	1
Max. boost/cut	12 dB
Filter (12 dB/Oct.)	High pass at 31.5 Hz Low pass at 16kHz
Input level	–10 dB (316mV), with ±10 dB adjustment for each channel
Input Impedance	Greater than 100k ohms
Output level	–10 dB (316mV)
Output Load Impedance	Greater than 10k ohms, unbalanced
Headroom	25 dB
Frequency response	20 Hz to 30kHz, ±0.5 dB
T.H.D.	0.03% or less
Signal-to-Noise Ratio	82 dB or better

Power Requirement and Consumption

Model	Voltage (V)	Frequency (Hz)	Consumption (W)
U.S.A./CND	117	60	7
AUS/UK	240	50	7
EUR	220	50	7
GENERAL EXPORT	117/220, 240	50/60	7

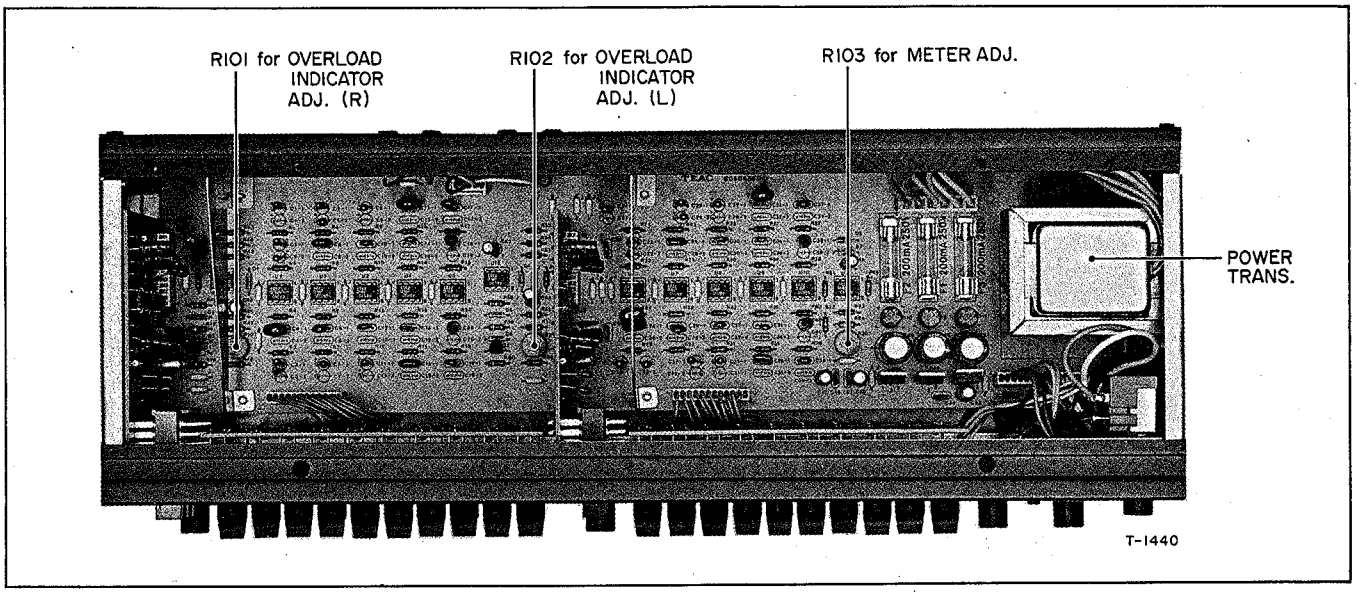
Weight	4.5 kg (10 lbs) net
Dimensions (WHD)	440 mm x 93 mm x 170 mm

NOTE: Changes in specifications and features may be made without notice.
Value of "dB" in the data refers to 0 dB = 1V, except where specified.
If Test Set or AC Voltmeter calibrated to 0 dB = 0.775V is used, appropriate compensation should be made.

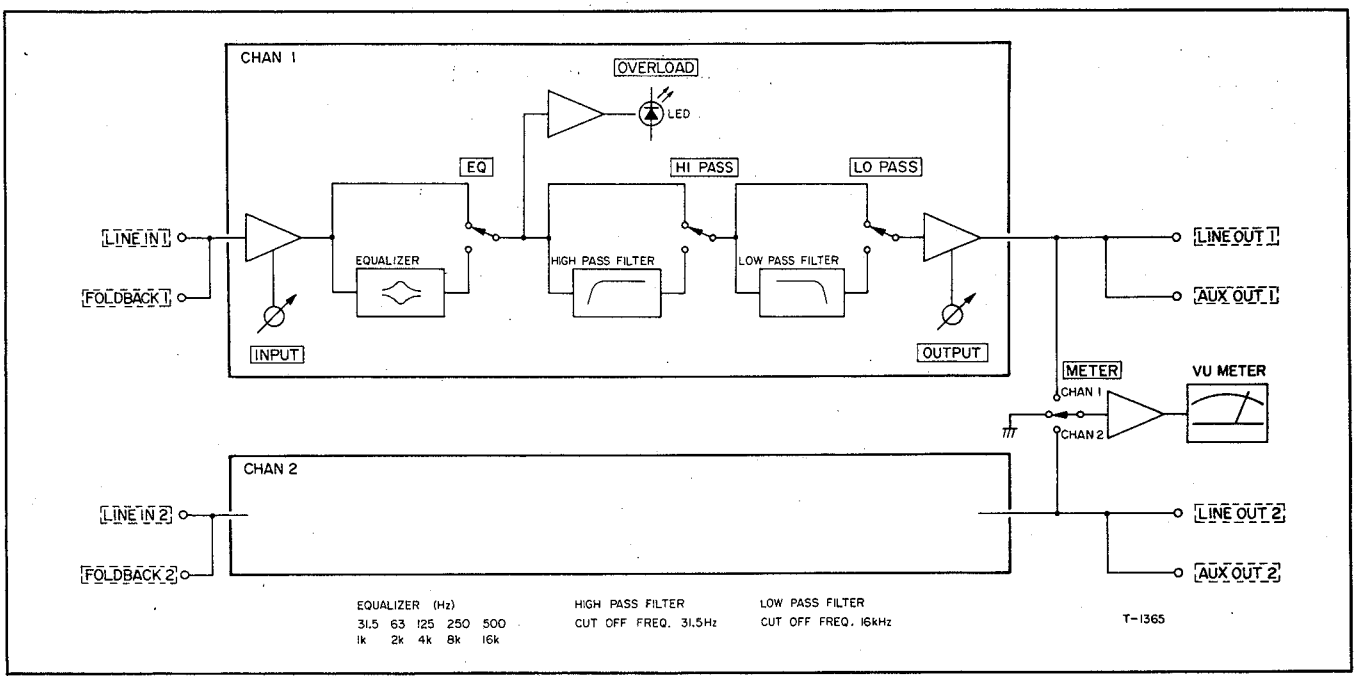
TEST EQUIPMENT REQUIRED

Oscillator	Audio use, distortion less than 0.01% (at 1kHz)
AC Voltmeter	–100 dB ~ +40 dB, imp. = 1MΩ, ⟨ 25 pF
Distortion Meter	0.01% ~ 100%, imp. = ⟩ 100 kΩ

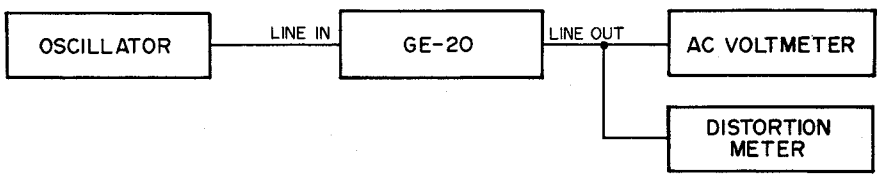
PARTS LOCATION ADJ. POINT



BLOCK DIAGRAM



TEST CONNECTION



CHECK AND ADJUSTMENT PROCEDURE

* Measurement remarks:
  0 dB = 1V
  Output load impedance 10k ohms or more

1-1 SPECIFIED INPUT/OUTPUT LEVEL SETTING

PREPARATIONS:
- EQ SW . . . . . OFF
- HI PASS SW . . . . . OFF
- LO PASS SW . . . . . OFF
- INPUT Controls 0
- OUTPUT METER SW should be center position
- Both CHANNEL Frequency Range knobs in 0 (click) position.

1. Connect an AC Voltmeter to the LINE OUT jacks.
2. Apply 1 kHz –10 dB (316 mV) to the LINE IN jacks.
3. Adjust OUTPUT level controls (CHAN 1 and CHAN 2) for –10 dB (316 mV) at LINE OUT jacks.

1-2 VU METER CAL.

4. Place the OUTPUT METER SW to the CHAN 1 position.
5. Adjust R103 for 0 VU reading on the VU Meter.
6. Change the OUTPUT METER SW to the CHAN 2 position.
7. Check the 0 VU reading on VU Meter.

NOTE: After that, release the METER SW to the center position.

1-3 OVERLOAD INDICATOR ADJ.

8. Place the INPUT Level controls to maximum position.
9. Apply a 1 kHz +5 dB (1.78V) to the LINE IN jacks.
10. Check that the OVERLOAD Indicator lights at full intersity.
11. Also, check that the OVERLOAD Indicator goes out when the Input level is +3 dB (1.41V).
12. If adjustment is necessary, adjust R101/102 on EQ AMP PCB ASSY.

1-4 FREQUENCY RESPONSE CHECK

13. Place the INPUT controls to the 0 (center) position.
14. Output/Input levels should be at the specified level (–10 dB) settings.
15. Apply signal swept from 20 Hz to 30 kHz.
16. Check the frequency response, is within the Response limits ±0.5 dB.

1-5 S/N RATIO CHECK

17. Ground LINE IN jacks.
18. OUTPUT and INPUT controls should be at the specified positions.
19. The AC voltmeter connected to the LINE OUT jacks should indicate –92 dB (25.1μV) or less.

NOTE: This corresponds to Signal-to-Noise Ratio of 82 dB; Difference between residual noise of –92 dB and specified level of –10 dB.

1-6 DISTORTION CHECK

20. Same conditions as above Item 1-5, step 18.
21. Apply a 1 kHz –10 dB (316mV) signal to the LINE IN jacks.
22. Connect a Distortion Meter to LINE OUT jacks.
23. The distortion factor read on the distortion meter should be 0.03% or less.

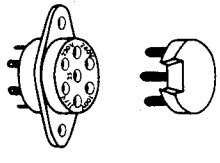
1-7 CENTER FREQUENCY VARIABLE LIMITS CHECK

24. Place the EQ SW to the ON (push) position.
25. Apply each center frequency signal at –10 dB (316 mV) to the LINE IN jacks.
26. Slide the appropriate slider control knob up and down.
27. Check the center Frequency Response is within the variable response limits ±12 dB.

Voltage Conversion Procedure (General Export Model)

If the AC power line (mains) voltage in your area does not match the AC power requirements indicated on the label attached to this unit or printed on the packing carton, this unit must be adjusted using the following procedure.
FIRST MAKE SURE THE AC POWER CORD IS DISCONNECTED FROM THE AC OUTLET OR POWER SOURCE.

1. Remove the top cover of the unit by removing 2 rear screws.
2. Locate the voltage selector plug near the transformer inside the unit.
3. Pull out the plug and reinsert it so that the desired voltage appears in the cut-out window of the plug.
4. Replace the top cover of the unit.



PARTS LIST

—PARTS ORDERING INFORMATION—

Spare parts are available through your nearest TEAC Authorized Service Center or directly from the TEAC office, the address of which is written on the back cover. When ordering parts, always include the following information:

1. MODEL
2. REF. NO.
3. PARTS NO.
4. DESCRIPTION
5. UNIT SERIAL NO.
6. MANUAL CODE NO.

NOTICE REGARDING PARTS ORDERS

1. Do not order by REF. NO. only.
2. In some instances, individual minor parts are not available. In such a case, the entire assembly including the part requested will be sent to you.
3. Parts are identical between the different models with the exceptions as coded by the designations in the REMARKS column.
4. PC Boards shown viewed from component side.

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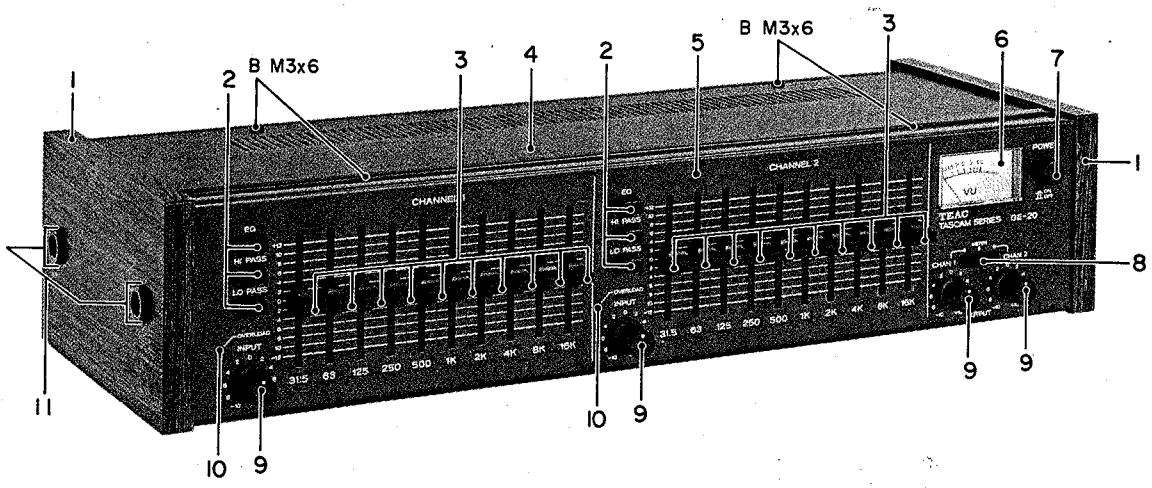
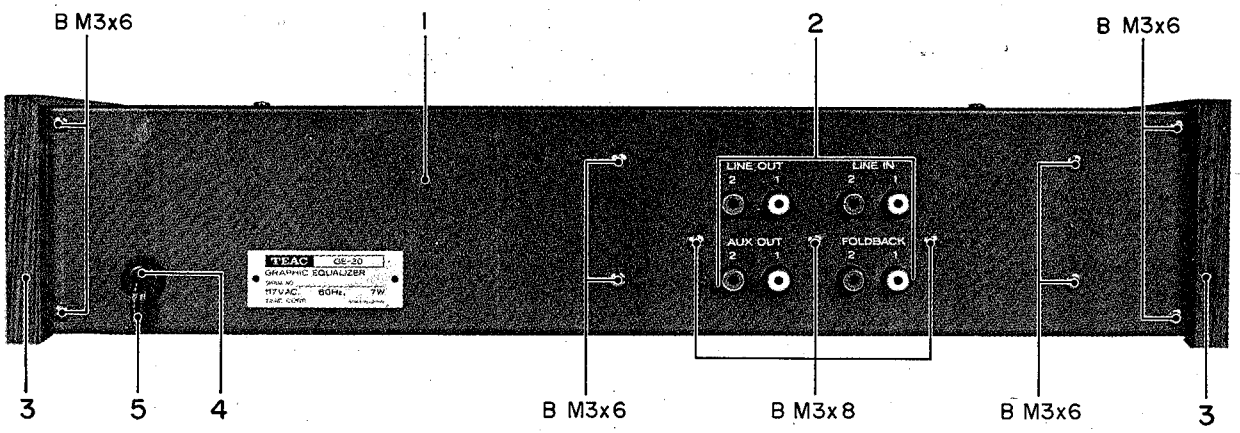
PARTS LOCATION AND PARTS LIST SECTION

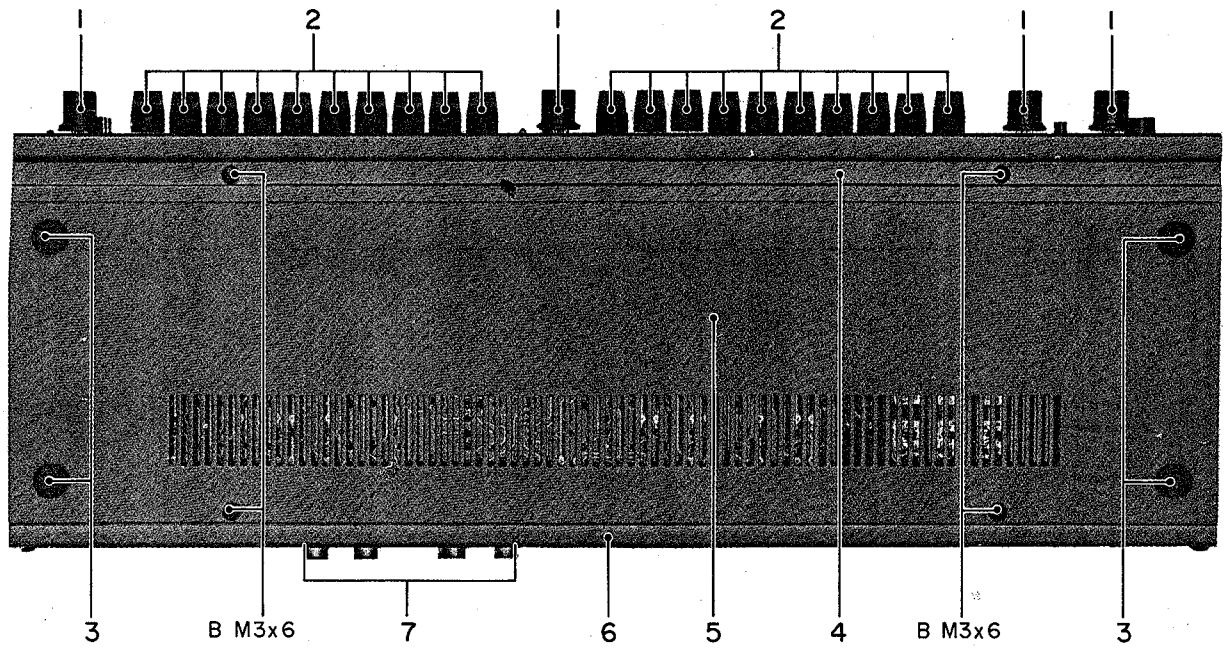
PARTS LOCATION-1.



PARTS LOCATION-2.



PARTS LOCATION-3.

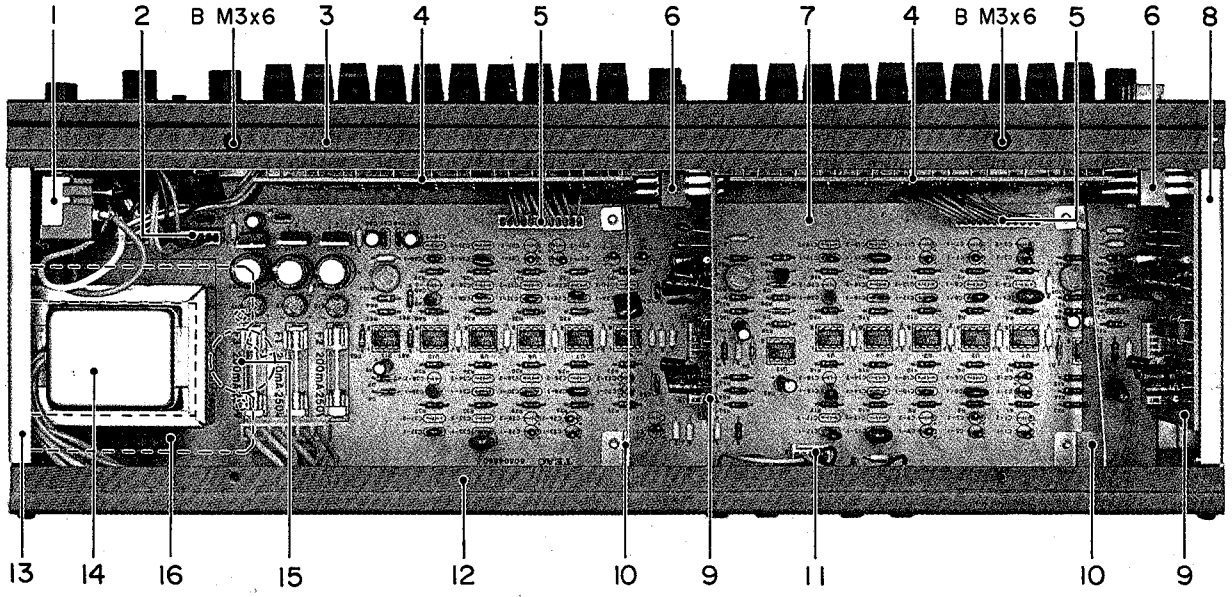


REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
1 - 1	60380870	Board, Side	
1 - 2	60514400	Switch, Push	
1 - 3	60060730	Knob	
1 - 4	60375490-02	Cover, Top	
1 - 5	60362631-01	Panel, Front; A	All except JAPAN
	60362631-02	Panel, Front; B	JAPAN
1 - 6	60550210	Meter, VU	
1 - 7	50253500	Button, Push	
1 - 8	60060720	Knob, Lever	
1 - 9	60060161	Knob, B-15S	
1 - 10	60483340	LED	
1 - 11	55044980	Screw Assy, Side Board	
	55342780	Washer, Side Board	Part of 1 - 11
	55810500	Screw, Side Board; B	Part of 1 - 11

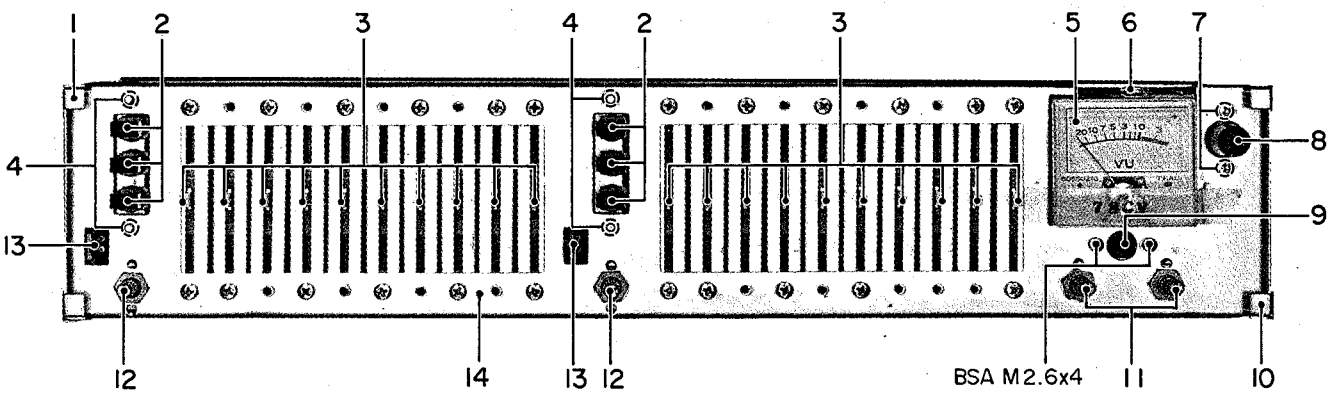
REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
2 - 1	60362640	Panel, Rear	
2 - 2	60523470	Terminal Assy	
2 - 3	60380870	Board, Side	
2 - 4	60450290	Strain Relief, AC Power Cord	All except AUSTRALIA
	51920670	Strain Relief, AC Power Cord	AUSTRALIA
2 - 5	51280340	Cord, AC Power	JAPAN, GENERAL EXPORT
	51280750	Cord, AC Power	U.S.A., CANADA
	60491250	Cord, AC Power	EUROPE
	51280470	Cord, AC Power	U.K.
	60491180	Cord, AC Power	AUSTRALIA

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
3 - 1	60060161	Knob, B-15S	
3 - 2	60060730	Knob	
3 - 3	50285540	Foot	
3 - 4	60362630-01	Panel, Front; A	All except JAPAN
	60362630-02	Panel, Front; B	JAPAN
3 - 5	60375490-01	Cover, Bottom	
3 - 6	60362640	Panel, Rear	
3 - 7	60523470	Terminal Assy	

PARTS LOCATION-4.



PARTS LOCATION-5.



INCLUDED ACCESSORIES

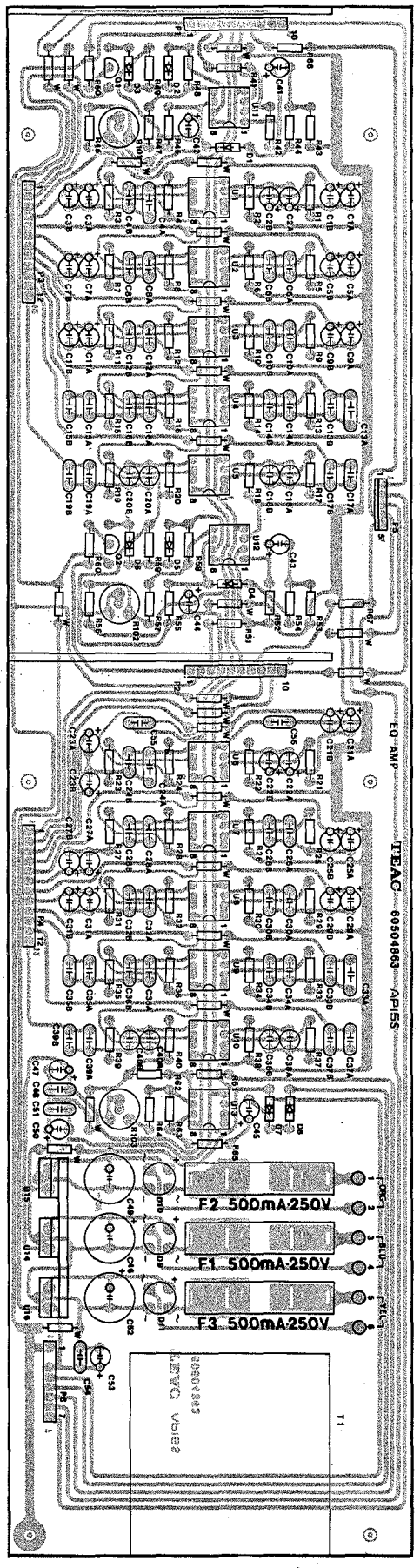
REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
	60375510	Adaptor, Rack Mounting (2 used) Screw, B M4 x 8 (4 used)	
	51016370	GE-20 Owner's Manual	JAPAN
	51016380	GE-20 Owner's Manual	All except JAPAN

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
4 - 1	51340460	Switch, Power	JAPAN, U.S.A., CANADA, GENERAL EXPORT
	51340110	Switch, Power	EUROPE, U.K., AUSTRALIA
4 - 2	60523490	Connector Assy, B; 7P	
4 - 3	60362631-01	Panel, Front; A	All except JAPAN
	60362631-02	Panel, Front; B	JAPAN
4 - 4	60854410	PCB Assy, VOLUME	
	60504881	PCB, VOLUME	Part of 4 - 4
4 - 5	60523530	Connector Assy, C	
4 - 6	60514400	Switch, Push	
4 - 7	60854400-01	PCB Assy, EQUALIZER AMP	U.S.A., CANADA
	60854400-02	PCB Assy, EQUALIZER AMP	EUROPE, U.K., AUSTRALIA
	60854400-03	PCB Assy, EQUALIZER AMP	JAPAN, GENERAL EXPORT
	60504861	PCB, EQUALIZER AMP	Part of 4 - 7
4 - 8	60375460	Chassis, Side, L	
4 - 9	60854390	PCB Assy, FILTER AMP	
	60504871	PCB, FILTER AMP	Part of 4 - 9
4 - 10	60375480	Bracket, PCB	
4 - 11	60523480	Connector Assy, A; 5P	
4 - 12	60362641	Panel, Rear	
4 - 13	60375471	Chassis, Side; R	
4 - 14	60461071	Transformer, Power	U.S.A., CANADA
	60460831	Transformer, Power	EUROPE, U.K., AUSTRALIA
	60460841	Transformer, Power	GENERAL EXPORT
	60461081	Transformer, Power	JAPAN
4 - 15	50435060	Selector, Voltage	GENERAL EXPORT
4 - 16	60375501	Bracket, Voltage Selector	GENERAL EXPORT

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
5 - 1	60375460	Chassis, Side; L	
5 - 2	60514400	Switch, Push	
5 - 3	60412140	Var. Res., Slide; 100 k ohm - W	Part of 4 - 4
5 - 4	60030790	Stay, A	
5 - 5	60550210	Meter, VU	
5 - 6	60468080	Lamp, Subminiature	
5 - 7	60030800	Stay, B	
5 - 8	51340460	Switch, Power	JAPAN, GENERAL EXPORT U.S.A., CANADA
	51340110	Switch, Power	EUROPE, U.K., AUSTRALIA
5 - 9	60518100	Switch, Lever	
5 - 10	60375431	Chassis, Side; R	
5 - 11	60421140	Var. Res., 10 k ohm - W	
5 - 12	60421150	Var. Res., 10 k ohm - W	
5 - 13	60483340	LED	
5 - 14	60375440	Chassis, Front	

PC BOARD SECTION

1. EQUALIZER AMP PCB ASS'Y



EQUALIZER AMP PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	60854400-01	PCB Assy, EQUALIZER AMP (U.S.A., CANADA)
	60854400-02	PCB Assy, EQUALIZER AMP (AUSTRALIA, U.K., EUROPE)
	60854400-03	PCB Assy, EQUALIZER AMP (JAPAN, GENERAL EXPORT)
	60504861-00	PCB, EQUALIZER AMP
	IC's	
U1 ~ U13	60486070-00	NJM4558DF
U14, U15	60486150-00	FS-7815M
U16	60486140-00	FS-7805M
	TRANSISTORS	
Q1, Q2	60480850-00	2SC711A-F
	DIODES	
D1 ~ D6	60483640-00	1SS53
D7, D8	50422130-00	1N60
D9 ~ D11	60483710-00	W-02M

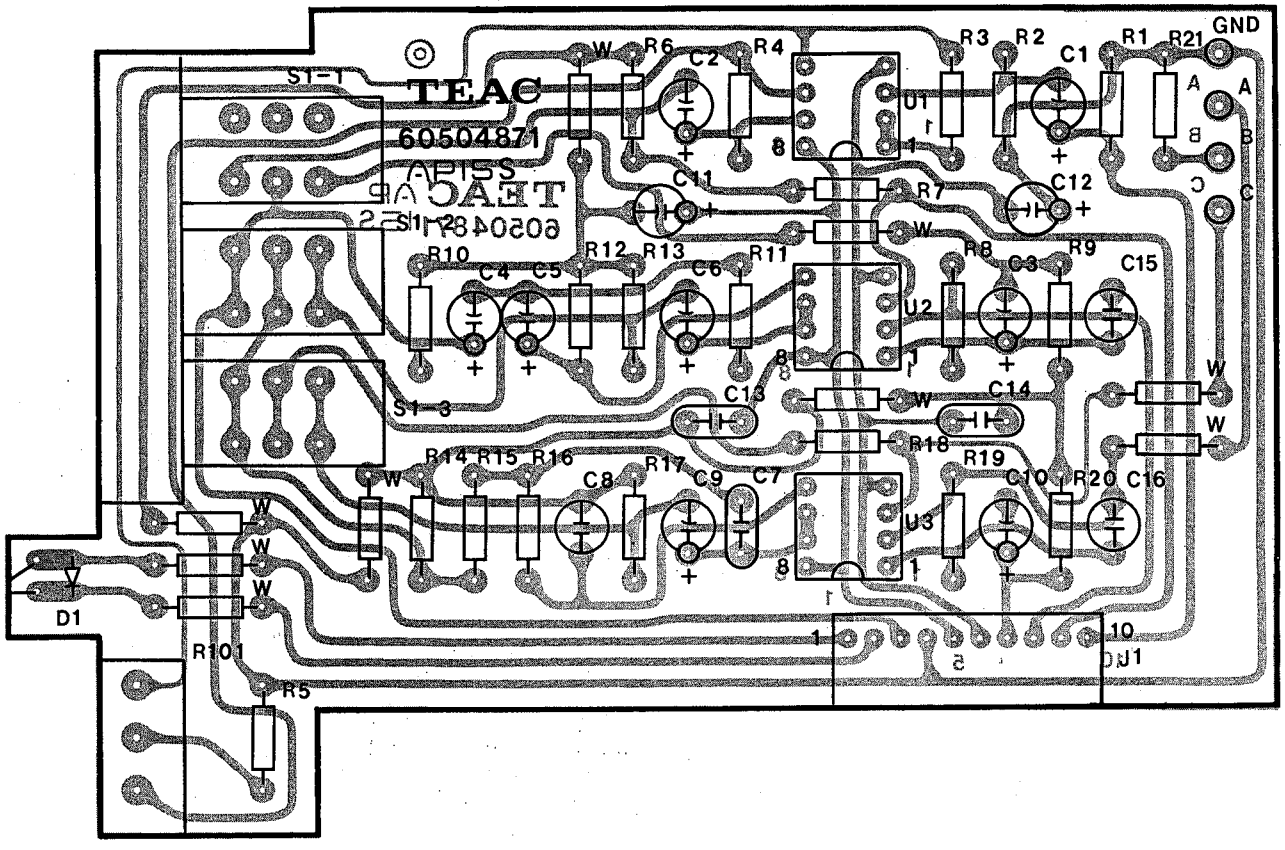
CARBON RESISTORS

All resistors are rated ±5% tolerance and ¼ watt.

R1, R21	510 ohm
R2, R22	56 k ohm
R3, R23	510 ohm
R4, R24	56 k ohm
R5, R25	510 ohm
R6, R26	56 k ohm
R7, R27	510 ohm
R8, R28	56 k ohm
R9, R29	510 ohm
R10, R30	56 k ohm
R11, R31	510 ohm
R12, R32	56 k ohm
R13, R33	510 ohm
R14, R34	56 k ohm
R15, R35	510 ohm
R16, R36	56 k ohm
R17, R37	510 ohm
R18, R38	56 k ohm
R19, R39	510 ohm
R20, R40	56 k ohm
R41, R51	100 k ohm
R42, R52	22 k ohm
R43, R53	10 k ohm
R44, R54	1 k ohm
R45, R55	220 k ohm
R46, R56	33 k ohm
R47, R57	1 k ohm
R48, R58	470 k ohm
R49, R59	3.9 k ohm
R50, R60	390 ohm
R61	1 k ohm
R62	220 k ohm
R63	22 k ohm
R64	5.6 k ohm
R65	3.9 k ohm
R66, R67	100 ohm

REF. NO.	PARTS NO.	DESCRIPTION		
	CAPACITORS			
C1, C21	60432500-00	Dip. Tant.	4.7 mfd	6.3V
C2-1, C22-1	60434900-00	Dip. Tant.	0.1 mfd	35V
C2-2, C22-2	60434900-00	Dip. Tant.	0.1 mfd	35V
C3-1, C23-1	60432510-00	Dip. Tant.	2.2 mfd	16V
C3-2, C23-2	60432520-00	Dip. Tant.	0.33 mfd	35V
C4, C24	60445490-00	Mylar	0.082 mfd	
C5-1, C25-1	60432530-00	Dip. Tant.	1 mfd	25V
C5-2, C25-2	60432540-00	Dip. Tant.	0.22 mfd	35V
C6, C26	60445080-00	Mylar	0.047 mfd	
C7, C27	60432550-00	Dip. Tant.	0.68 mfd	35V
C8, C28	60445070-00	Mylar	0.022 mfd	
C9, C29	60432520-00	Dip. Tant.	0.33 mfd	35V
C10, C30	60445430-00	Mylar	0.01 mfd	
C11, C31	60432560-00	Dip. Tant.	0.15 mfd	35V
C12, C32	60445300-00	Mylar	0.0056 mfd	
C13, C33	60445490-00	Mylar	0.082 mfd	
C14, C34	60445460-00	Mylar	0.0027 mfd	
C15, C35	60445100-00	Mylar	0.039 mfd	
C16, C36	60445240-00	Mylar	0.0015 mfd	
C17, C37	60465070-00	Mylar	0.022 mfd	
C18, C38	60435670-00	Polyst.	680 pfd	
C19, C39	60445430-00	Mylar	0.01 mfd	
C20, C40	60435730-00	Polyst.	330 pfd	
C41, C43	50554530-00	Elec.	4.7 mfd	25V
C42, C44	50554670-00	Elec.	1 mfd	25V
C45	50554530-00	Elec.	4.7 mfd	25V
C46, C49	50554380-00	Elec.	220 mfd	35V
C47, C50	50554040-00	Elec.	10 mfd	25V
C48, C51	60440050-00	Ceramic	0.01 mfd	
C52	50554380-00	Elec.	220 mfd	35V
C53	50554040-00	Elec.	10 mfd	25V
C54	60440050-00	Ceramic	0.01 mfd	
C55, C56	60440050-00	Ceramic	0.01 mfd	
	VARIABLE RESISTORS			
R101~R103	50533460-00	Semi-fixed, 4.7 k ohm		
	MISCELLANEOUS			
P1, P2	60522760-10	Connector, Plug; 10P		
P3, P4	60522760-12	Connector, Plug; 12P		
P5	60522260-05	Connector, Plug; 5P		
P6	60522280-07	Connector, Plug; 7P		
P7	60522640-06	Connector, Plug; 6P		
	50411460-00	Holder, Fuse (U.S.A., CANADA, JAPAN, GENERAL EXPORT)		
	50420870-00	Holder, Fuse (AUSTRALIA, U.K., EUROPE)		
F1 ~ F3	50411460-00	Fuse, 500 mA 250V (U.S.A., CANADA)		
	50411540-00	Fuse, 500 mA 250V (AUSTRALIA, U.K., EUROPE)		
	50411130-00	Fuse, 500 mA 250V (JAPAN, GENERAL EXPORT)		

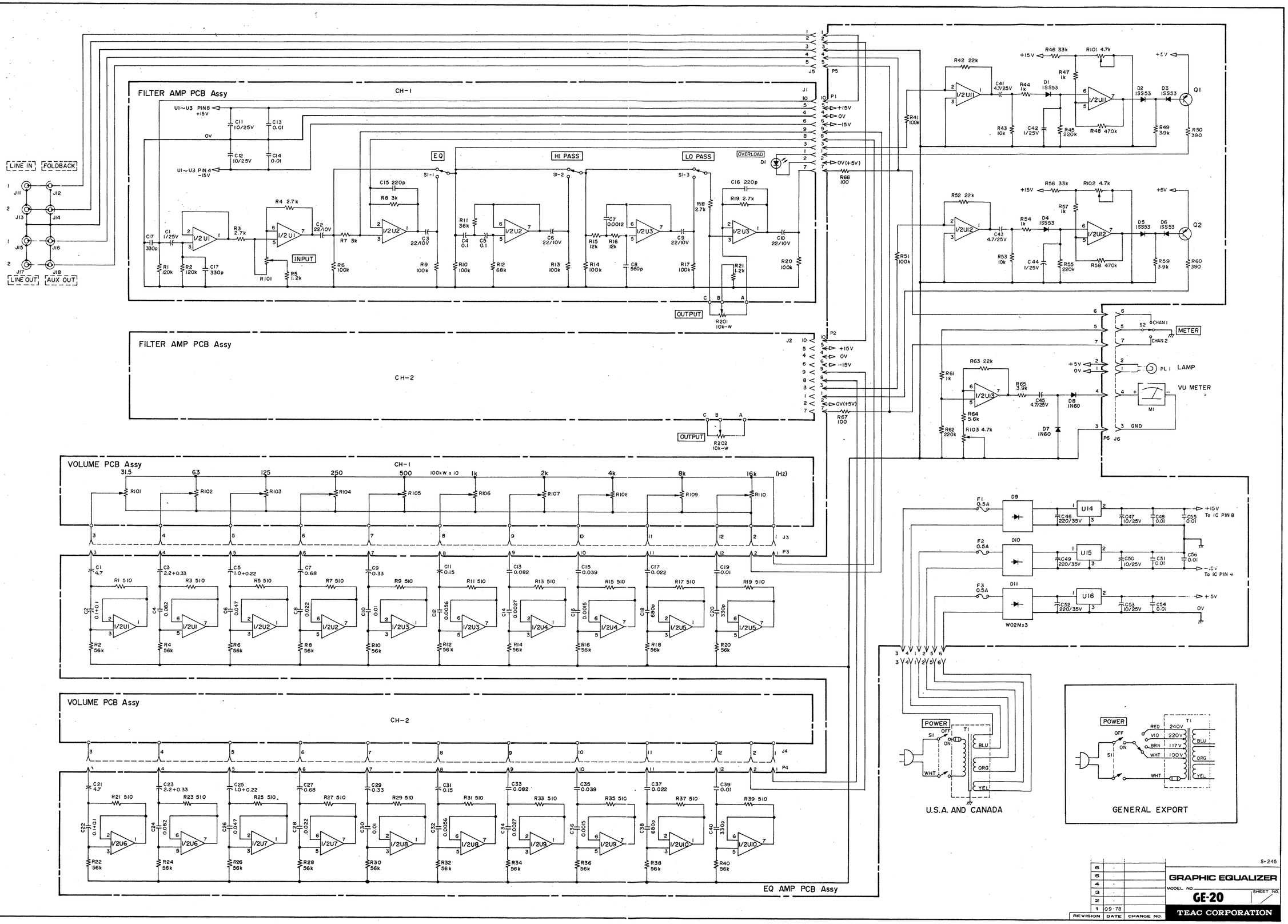
2. FILTER AMP PCB ASS'Y



FILTER AMP PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	60854390-00	PCB Assy, FILTER AMP
	60504871-00	PCB, FILTER AMP
	IC's	
U1 ~ U3	60486420-00	NJM4559-DD
	CARBON RESISTORS	
	All resistors are rated ±5% tolerance and ¼ watt.	
R1, R2		120 k ohm
R3, R4		2.7 k ohm
R5		1.2 k ohm
R6		100 k ohm
R7, R8		3 k ohm
R9, R10		100 k ohm
R11		36 k ohm
R12		68 k ohm
R13, R14		100 k ohm
R15, R16		12 k ohm
R17		100 k ohm
R18, R19		2.7 k ohm
R20		100 k ohm
R21		1.2 k ohm

REF. NO.	PARTS NO.	DESCRIPTION		
	CAPACITORS			
C1	50554670-00	Elec.	1 mfd	25V
C2, C3	60430160-00	Elec.	22 mfd	10V
C4, C5	60432490-00	Dip. Tant.	0.1 mfd	35V
C6	60430160-00	Elec.	22 mfd	10V
C7	60445230-00	Mylar	0.0012 mfd	
C8	60435720-00	Polyst.	560 pfd	
C9, C10	60430160-00	Elec.	22 mfd	10V
C11, C12	50554040-00	Elec.	10 mfd	25V
C13, C14	60440050-00	Ceramic	0.01 mfd	
C15, C16	60435550-00	Polyst.	220 pfd	
C17	60435730-00	Polyst.	330 pfd	
	VARIABLE RESISTOR			
R101	60421150-00	10 k ohm - W		
	MISCELLANEOUS			
S1	60514400-00	Switch, Push		
J1	60523510-10	Connector, Socke; 10P		
D1	60483340-00	LED (RED)		
W		Jumper, JPW-02A (9 used)		



REVISION	DATE	CHANGE NO.
6		
5		
4		
3		
2		
1	09-78	

S-245

GRAPHIC EQUALIZER

MODEL NO. GE-20

SHEET NO.

TEAC CORPORATION

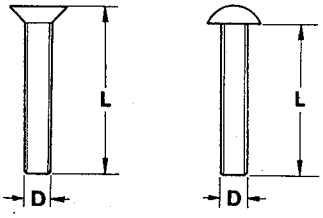
ASSEMBLING HARDWARE CODING LIST

All screws conform to ISO standards, and have crossrecessed heads, unless otherwise noted.
ISO screws have the head inscribed with a point as in the figure to the right.

FOR EXAMPLE:

B M 3 x 6

- B — Nomenclature
- M — Metric System
- 3 — Diameter in mm (D) *
- 6 — Length in mm (L)



* Inner dia. for washers and nuts

	Code	Name	Type
MACHINE SCREW	R	Round Head Screw	
	P	Pan Head Screw	
	T	Stove Head Screw (Truss)	
	B	Binding Head Screw	
	F	Flat Countersunk Head Screw	
	O	Oval Countersunk Head Screw	
WOOD SCREW	RW	Round Head Wood Screw	
	FW	Flat Countersunk Wood Screw	
	OW	Oval Countersunk Wood Screw	
SEMS SCREW	BSA	Binding Head SEMS Screw(A Type)	
	BSB	Binding Head SEMS Screw(B Type)	
	BSF	Binding Head SEMS Screw(F Type)	
	PSA	Pan Head SEMS Screw(A Type)	
	PSB	Pan Head SEMS Screw(B Type)	

	Code	Name	Type
TAPPING SCREW	BTA	Binding Head Tapping Screw(A Type)	
	BTB	Binding Head Tapping Screw(B Type)	
	RTA	Round Head Tapping Screw(A Type)	
	RTB	Round Head Tapping Screw(B Type)	
SETSCREW	SF	Hex Socket Setscrew(Flat Point)	
	SC	Hex Socket Setscrew(Cup Point)	
	SS	Slotted Socket Setscrew(Flat Point)	
WASHER	E	E-Ring (Retaining Washer)	
	W	Flat Washer (Plain)	
	SW	Lock Washer (Spring)	
	LWI	Lock Washer (Internal Teeth)	
	LWE	Lock Washer (External Teeth)	
	TW	Trim Washer (Countersunk)	
NUT	N	Hex Nut	